UNIVERSITI PUTRA MALAYSIA

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FEM 1999 6

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SERDANG, SELANGOR DARUL EHSAN

1999

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By
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Project report submitted in partial fulfillment of the requirements for the Degree of Master of Science (Tropical Forest Resource Management) in the Faculty of Forestry, University Putra Malaysia

FACULTY OF FORESTRY
UNIVERSITY PUTRA MALAYSIA
SERDANG, SELANGOR DARUL EHSAN

APRIL 1999

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DEDICATION

My Family;

Apai (Niang)

Indai

Balau ak. Maling

Chanda ak. Maling

Embang ak. Gaung

Hamdiah Pani

Lucy ak. Embang

Slyvester Juat ak. Embang

Reuter ak. Balau

Andria ak. Balau

ACKNOWLEDGEMENT

Great thank to my beloved supervisor DR. Mohamed Zakaria Hussin for his dedicated efforts, guidance, and constant encouragement throughout the research.

I would like to express my heartiest appreciation to DR. Faridah Hanum our coordinator, Dean Faculty of Forestry, lecturers and all staff of Faculty of Forestry University Putra Malaysia. I appreciated their comments, criticism and encouragement during the project implementation.

And to my **classmates** Abaidullah Mustapha, Nur Hajar, Ibrahim and Imam; My **Family, Cousin** and **friends**. Thanks a lot for your technical and moral support.

Sat Maling

May 1999

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Abstract

A study of population of the Cattle Egret (*Bubulcus ibis*) was conducted at the Grassland, University Putra Malaysia, Serdang Selangor. The objectives of this study were to (1) estimate the population size and (2) examine the feeding habitats of egrets. Distance Sampling Method was used for this study where five transects namely Transect A, Transect B, Transect C, Transect D and Transect E were established randomly in the study area. The length of each transect A, B, C, D and E was 390 m, 370 m, 310 m, 500 m and 480 m respectively. Each line was surveyed continuously at 3 days with two in morning and afternoon. Program DISTANCE V2.2 was used to estimate the density. Feeding habitat of Cattle Egret was conducted by direct observation. The density of Cattle Egret ranged from 2.51 to 4.34 individuals per hectare. The population size of egrets at the Grassland area of University Putra Malaysia, Serdang Selangor, Malaysia ranged from 648 to 1120 birds. The feeding habitat of egret was found to be associated with cattle. However, the number of egrets was less when the cattles were not feeding in the field, because cattles provided flies and cattle ticks for egrets.

Abstrak

Kajian berkenaan dengan Populasi Burung Kendi (*Bubulcus ibis)* telah dijalankan di Unit Ternakan (Grassland), Universiti Putra Malaysia, Serdang Selangor. Objektif kajian adalah untuk menentukan populasi dan memeriksa habitat pemakanan (Feeding habitat) burung kendi. Kaedah Transek Persampilan Jarak Jauh secara rawak telah dipilih yang terdiri daripada lima transek A, B, C, D dan E, masing – masing berukuran 390 m, 370 m, 310 m, 500 m dan 480 m. Setiap transek dibanci dan diperiksa selama 3 hari berturut – turut dengan satu pemerhatian pagi dan petang. Software DISTANCE V2.2 telah digunakan untuk menganalisis densiti, manakala pemerhatian secara terus (direct observation) bagi habitat pemakanan. Hasil kajian menunjukkan, densiti Burung Kendi dengan julat 2.51 hingga 4.34 per ha telah perolehi. Populasi keseluruhan ialah diantara julat 648 hingga 1120 ekor. Habitat pemakanan pula mendapati burung ini makan bersekutu dengan lembu. Namun begitu bilangan burung ini berkurang apabila lembu tidak meragut di padang ragut, kerana kehadiran lembu membekalkan sumber makanan seperti lalat dan kutu yang merupakan makanan penting bagi Burung Kendi

CHAPTER ONE

1.1 Introduction

Cattle Egret (*Bubulcus ibis*) is one of the widely studied members of the family Ardeidae (Phillips and Holmes, 1998; Gopakumar, 1992; Scott, 1984; and Burger, 1982). It is noted for its foraging association with herds of grazing animals such as buffalo, and elephant in Africa (its country of origin) and cattle, horses and even sheep through its current world-wide range.

A Cattle Egret is graceful white herons of coastal marshes and mud banks and is mainly migrants to Southeast Asian region. It has a yellow bill and acquires some buff plumes before departing in spring (Phillips, 1998). According to Geering *et al.,* (1998) and McKilligan, (1994), the cattle egret species has previously been defined as a partial migrant bird which that their population contain substantial migrating and non-migrating elements. This assumption has been made partly because of the application of a limited definition of migrant and partly because of the inability to distinguish between local, visiting and transient birds in unmarked flocks (Maddock and Greering, 1994).

In flight, they hold their necks in a 'S' shape and fly with rather slow, steady beats on rounded wings (Phillips and Holmes, 1998), because egrets have large wings, which are more efficient than smaller ones and they need to flap them only about twice a second, in contrast to the 80 wing beats per second of the tiniest

humming – birds. Flights such as these require that migrants carry large stores of fat for fuel and maintain themselves in top physiological condition (Hutto, 1998). Geering *et al.,* 1998 noted that Cattle Egret could fly until 2250 km at a speed 43 km/h for 52 hours. Maddock and Geering (1994), stated that Cattle Egret can fly from short distance movements within the food plain near the natal colony, to winter roosts up to more than 2000km distant. Migration occurs predominantly along the southern East Coast plain of Australia, to Tasmania and New Zealand.

Information regarding population is also of general ecological and management interest since a time series of counts can be an effective monitor of the conservation status of the inhabitants. To form the basis of proactive monitor management decisions, however, it is necessary to understand the factors responsible for observed population changes. If changing food and feeding habitat areas are implicated in population fluctuations, it may be necessary to manage areas surrounding population that supply food for breeding birds.

1.2 Objective of study

The objectives of this study are to (1) estimate the population size and (2) examine the feeding habitats of the Cattle Egret (*Bubulcus ibis*) at the Grassland of University Putra Malaysia, Serdang Selangor.

CHAPTER TWO

LITERATURE REVIEW

2. 1 Grassland

Grassland may be defined as the 'vegetation type in which the grasses (Gramineae) are dominant. The biotic factors responsible for the development of the grassland are deforestation, shifting cultivation, burning woodland for land – reclamation and grazing herds of cattle in the scrub jungle (Majumdar and Brahmachari, 1988). Kattel *et al.,* (1999), burning is the most suitable form of management in the grasslands, as it is though to prevent succession to forest, provide forage for grasslands regenerate and prevent damaging hot burns later in the dry season. The impact of cutting and burning on the grassland communities, together with other important disturbance factors such as grazing and flooding, are however poorly understood. Consequently, the importance of these factors for faunal species conservation is also little known (Kattel *et al.,* 1999; Eriksson and Jacobsson 1998; Bell and Oliver, 1992).

Natural grassland can be defined as an ecosystem in which the dominant plant species are grasses and where aridity is a feature of the environment for shorter or longer periods (Mandor and Kun, 1982). The relative abundance of various grass species depends on precipitation, temperature and soil structure (Misra, 1974). According to Kattel *et al.,* (1999) and IUCN (1993), the grassland are key sites for biodiversity conservation, not only as a restricted area habitat, but

also for the range of endangered faunal species. Roy (1984), points out that extensive grassland supports many bird species which forage, roost and breed in this habitat. In addition, Collias (1986), has highlighted the importance of fine grass used in the nest lining of many bird species, whether or not they inhabit grasslands. A significant volume of air is trapped in nests having a lining of fine grassy material, which provided good insulating properties.

The grassland is one of the major ecosystems of the terrestrial environment. Including arid and semi–arid regions, the grassland covered nearly 40 percent of the world's land surface before the impact of man and his domesticated animals (Rahmani, 1988). Tropical and subtropical grasslands occupy an area of approximately 32,000,000 km^2 in the plains and mountains lying between 30^0 N and 30^0 S (Misra, 1974). Today, the remaining size of grassland is smaller. It is due to heavy grazing pressure and conversion of grasslands into agricultural fields, the flora and fauna of the grassland ecosystems have suffered a drastic decline or have become locally extinction (Kattel *et al.,* 1999).

2.2 Identification and voice of Cattle Egret

The Cattle Egret is a small heron standing about 50 cm in height, with a wingspan of about 93-cm and weighing about 350 – 400g. Its plumage is white and its breeding color is buff-orange on the shoulders, breast and head. The yellow bill distinguishes it from the Little Egret at all seasons and the black legs from the Reef Egret; in non – breeding plumage the differently shaped bill and small size

distinguish it from the Great and Plumed Egrets. The voice of Cattle Egret is silent except at the breeding colony, where it utters a variety of croaking and guttural notes. (Geering *et al.,* 1998).

2.3 Status and distribution of Cattle Egret

Until about 1930 Cattle Egret was confined to the Old World, but then they became establish in South America after crossing the Atlantic apparently unaided. They spread through the Caribbean islands and into North America, where they first bred in 1953. Half a world away, at the opposite end of their range, they colonized Northern Australia unaided by 1948 – though their subsequent spread through the Pacific Islands as far as Hawaii, has been helped by deliberate introductions (Rudolf *et al.,* 1989).

The egrets had been recorded in South America in the nineteenth century, but did not begin to breed there for over 50 years. In the birds original range, people and their cattle had been gradually replacing herds of wild herbivores for several thousand years, so the egrets were able to switch gradually from the wild species to the domesticated ones. In African region, Cattle Egret can still be seen accompanying herds of wild game, as they must have done before people began to replace the games with cattle (Rudolf *et al.,* 1989).

In Malaysia, there are no breeding records and, on present evidence, this egret is a winter visitor, frequenting pasture, paddy – fields and stubble, usually feeding in

association with cattle or buffaloes, and roosting communally in situations including mangrove and reed-beds over water (Medway *et al.,* 1976).

2.4 Food of Cattle Egret

Fujioka and Lane (1998), noted that the food of Cattle Egret at the paddy field is animals such as frogs, crayfish *Procambus clarkii*, loach *Misgurnus anguillicaudatus* and tadpoles. According to Davison and Fook, (1996) Cattle Egret found especially in grassland, near marshes, pools and rice field to get some foods.

McKilligan, (1984), noted that the food of Cattle egret is mostly flies, grasshoppers, cicadas, cattle ticks, anurans and spider. They feed almost entirely on pastures (98-100%) but a few patrolled the edge of a ploughed field capturing prey in its verge of long grass. Some foraged over the roots of a fallen tree and others fed on an earth. Most of egret fed, in characteristic manner, with stock, following grazing cattle horses, goats and sheep, capturing prey disturbed from the grass.

2.5 Heronry and Nest of Cattle Egret

Resource partitioning studies predict that species should divide the resource (nesting space) to reduce interspecific competition when the resource is limited. Studies on nesting space in herons, egrets and ibises have usually concentrated on describing nest site selection of one species in heronry (Burger, 1978). He examined 16 mixed species heronries in North and South America and found that in habitats

with homogeneous vegetation (all one species with no physical discontinuities), the birds partitioned the space by aligning themselves vertically with the largest species nesting highest and the smallest species nesting lowest. This pattern persisted regardless of the amount of vertical space density of nesting birds or number of nesting pairs. The only exception to the pattern was the cattle egret, which nests higher than its size would predict. Egrets were more aggressive than the native species, won more encounters and could take over the nests of other species (Burger, 1978).

In India, the nest of Cattle Egret is entangled. The favorite tree was *Ficus racemosa,* which that tree is about 31.3 m and the canopy cover was 429.83 sq.m. Cattle Egret used this tree as a night roost only during the non-breeding season (Gopakumar, 1992). Sometimes they nested in wet woodland, usually in brackish coastal swamps or on the shores of fresh - water lakes. They build a flimsy circular nest of sticks about 2 feet in diameter, in which they lay 3 to 5 eggs, white irregularly spotted and blotched with brown. Both sexes incubate for about 21 days. A week or two after hatching the young birds leave the nest and crawl around on the nearby branches of the trees. When they fall into water, which they frequently do, they are able to swim well enough to get back to the tree trunk and chamber up. Their first juvenile plumage is quite different from the adult, being a striking dark Grey–brown and white. They do not assume the pure white adult plumage with back wingtips until they reach their second year (Austine *et al.,* 1988).

Cattle Egret exhibits a regulation pattern in their roost immediately after their breeding which results in the invasion of a substantiate new areas by these birds. The egrets in Burma constructed their nest at the end of April or in early May, usually in the Cocoa trees that have been planted for shade in most towns, but sometimes in mango trees or bamboo clumps. The eggs are white with a faint blue or green tinge. (Gopakumar, 1992).

Although egrets are much less tied to the vicinity of water than most species of the heron and egret family are, they usually assemble near water before going to roost, and most roosting and nesting sites are in trees or bushes surrounded by water. (Rudolf *et al.,* 1989).

2.6 Feeding habitat of Cattle Egret

According to Murata *et al.,* (1998), egret species preferred meadows, marshes and rice fields for their feeding habitat. Rice *Oryza sativa* (L.) fields can be important foraging habitats for egrets especially for irrigation rice field.(Fujioka and Lane, 1998; Fasola *et al.,* 1996; Fasola and Ruiz, 1996; Yamagishi *et al.,* 1980). However, the new style of the feeding habitat such as shallow earth ditch and deep concrete-side ditch typical of old-style and new style paddy fields may reduce the abundance or composition of vertebrates prey of Cattle Egret, which in turn reduces the number of these birds foraging in rice field (Fujioka and Lane, 1998).

Mc Killigan (1984) also mentioned that, every herd in these flooded pastures had egrets in attendance but 82% of the egrets fed independently. Although the egrets' preferences were not quantify they seemed to avoid short – cropped dry pastures, with or without cattle, and favored those with tussocks of long grass. Estimation of cattle egret feeding range from the heronry is about 29.3 km.

2.7 Disease of Cattle Egret

Murata and Lane (1998), stated that the major parasite of cattle egret in Japan was trematode such as *Pegosomum* sp. This parasite attacked lumen, bile, colon and gallbladder and it may be an effected to the mortality of wild cattle egret. *Pegosomum* sp. also founded in South China. In India, 41 of 196 cattle collected in the wild were infected by *Pegosomum egretti*. However, mortality caused by *Pegosomum* sp. may be responsible for the natural death in free-living cattle egret.

According to Hendrix *et al.,* (1987), *Hypodectes propus bubuci* (HPB) attack of stroma of the heart of egrets. HPB was a mite of the family Hypoderatidae and found primarily in the subcutaneous tissue of the limbs and the beast muscles. To avoid this mites it is better to use Ivermectin and other parasitic mites, because it may be an effective treatment for hypopal acariasis in wild and domestic birds (Clubb, 1986).

2.8 Economic role of Cattle Egret

McKilligan (1984), stated that, in Australia, the Cattle Egret was useful, in reducing the numbers of flies which, annoy cattle, and as a predator of the cane toad. During the ploughings this bird reduced 45 % - 65% grub population. The egrets also eat the spiders, frogs and lizards which are the natural predators of these pests, but on balance its seems likely that Queensland Australia, as in South Africa, the net effect of the cattle egrets predations is to reduce the level of grass–eating insects to the benefit of the grazier. Blaker (1965), suggests that cattle egrets in South Africa 'may be of considerable importance as controllers of dipterous pests of cattle'.

CHAPTER THREE

MATERIALS AND METHODS

3.1 Site description

3.1.1 Location

Grassland is located on the Breed Units, University Putra Malaysia, Serdang Selangor, 25 km from Kuala Lumpur, and very closed to the Kuala Lumpur – Seremban Highway and Puchong Highway (Figure 1).

3.1.2 History

Several years ago, rubber and Oil palm was planted in the area. In 1979, the area was converted to grassland for grazing. The area was still under Breed Unit (Unit Ternakan) until early 1998. Then it was converted to Taman Penyelidikan Universiti. The site is considered flat but undulating with swamps and ponds along the area (Illustration 1). The total extend of the area is 258.06 ha, including ponds and swamps and Meat unit (144.9 ha), Dairy Unit (83.84 ha) and Deer Unit (20 ha) (Annual Report, 1995).

Illustration 1 : Site of research project